

Obtaining and Maintaining Optimal Body Weight



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Body Composition

- Hydrostatic Buoyancy Weight Test
- Skin fold calipers
- Electrical Impedance
- **Body Mass Index** — Take your weight (lbs) and divide by height (in). Take the result of that calculation and divide it by height again. Then multiply that number by 703. Round to the nearest decimal place.
$$\text{BMI} = [\text{weight} / (\text{height} \times \text{height})] \times 703$$
- CT Scan
- Bod Pod (Air Displacement)

		Weight in Pounds													
		120	130	140	150	160	170	180	190	200	210	220	230	240	250
Height in Feet and Inches	4'6"	29	31	34	36	39	41	43	46	48	51	53	56	58	60
	4'8"	27	29	31	34	36	38	40	43	45	47	49	52	54	56
	4'10"	25	27	29	31	34	36	38	40	42	44	46	48	50	52
	5'0"	23	25	27	29	31	33	35	37	39	41	43	45	47	49
	5'2"	22	24	26	27	29	31	33	35	37	38	40	42	44	46
	5'4"	21	22	24	26	28	29	31	33	34	36	38	40	41	43
	5'6"	19	21	23	24	26	27	29	31	32	34	36	37	39	40
	5'8"	18	20	21	23	24	26	27	29	30	32	34	35	37	38
	5'10"	17	19	20	22	23	24	26	27	29	30	32	33	35	36
	6'0"	16	18	19	20	22	23	24	26	27	28	30	31	33	34
	6'2"	15	17	18	19	21	22	23	24	26	27	28	30	31	32
	6'4"	15	16	17	18	20	21	22	23	24	26	27	28	29	30
6'6"	14	15	16	17	19	20	21	22	23	24	25	27	28	29	
6'8"	13	14	15	17	18	19	20	21	22	23	24	25	26	28	
		Underweight	Healthy Weight				Overweight				Obese				

Basal Metabolic Rate

- The amount of calories/day that your body requires for normal bodily functions (excluding activity factors), such as breathing, beating of the heart, digesting food, or life itself.

Calories and Pounds

- A calorie is a unit of measure for energy
- A pound is a unit of measure for mass, or weight
- 1 pound = 3500 calories
- Total Daily Energy Expenditure is the total number of calories that your body expends in 24 hours, including all activities—also known as your maintenance level

The Harris Benedict Formula

- This formula calculates the basal metabolic rate (BMR), factoring in height, weight, age, and sex, which is more accurate than determining calorie needs based on bodyweight alone. The equation:

Men: $66 + (13.7 \times \text{Weight in kg}) + (5 \times \text{Height in cm}) - (6.8 \times \text{Age in years})$

Women: $655 + (9.6 \times \text{Weight in kg}) + (1.8 \times \text{Height in cm}) - (4.7 \times \text{Age in years})$

****Pounds into Kilograms:** Divide the number of pounds by 2.2046, or multiply by 0.4536*

****Inches to Centimeters:** Multiply the number of inches by 2.54*

The Harris Benedict Formula

- To maintain your current weight, you simply need to multiply your BMR by your Activity Multiplier:
 1. Sedentary = $\text{BMR} \times 1.2$ (little or no exercise, desk job)
 2. Lightly active = $\text{BMR} \times 1.375$ (light exercise/sports, 1-3 days/wk)
 3. Moderately active = $\text{BMR} \times 1.55$ (moderate exercise/sports, 3-5 days/wk)
 4. Very Active = $\text{BMR} \times 1.725$ (hard exercise/sports, 6-7 days/wk)
 5. Extra Active = $\text{BMR} \times 1.9$ (hard, daily exercise/sports & physical job or 2x/day training, i.e. marathon, contest, etc.)

Example:

To determine BMR:

- You are female
- You are 30 years old
- You are 5'6" tall (167.6 cm)
- You weigh 120 lbs. (54.5 kilos)
- Your BMR = $655 + 523 + 302 - 141 = 1339 \text{ calories/day}$

To determine Total Daily Energy Expenditure (TDEE), multiply the BMR by the Activity Multiplier:

- Your BMR is 1339 calories/day
- Your activity level is moderately active
- Your activity factor is 1.55
- Your TDEE = $1.55 \times 1339 = 2075 \text{ calories/day}$

Maintaining, Losing, and Gaining Weight

- It's all a matter of caloric input and output:
 - To maintain your weight, you should remain at your daily caloric maintenance level
 - To lose weight, you need to reduce your calories slightly below your maintenance level or keep your calories the same and increase your activity above your current level
 - To gain weight, you need to increase your calories above your maintenance level

Losing Weight

- If you are eating more calories than you expend, you simply will not lose weight
- A negative calorie balance is essential to lose body weight
- Being properly hydrated is important to obtaining and maintaining a healthy body weight

Losing Weight

- Cutting 3500 calories/week (500 calories/day) can lead to the loss of 1 pound/week
 - This can be done through diet, exercise, or preferably a combination of both
- *Since the BMR equations do not factor in activity levels, the focus is more on reducing total daily calorie intake.

How Low is Too Low?

- Cutting calories too much slows down the metabolic rate and can lead to loss of lean mass
- The most common guideline for calorie deficits for fat loss is to reduce calories by at least 500 but not more than 1000 below your maintenance level
- The American College of Sports Medicine recommends calorie levels never drop below 1200 per day for women or 1800 per day for men
- Reducing calories by 15-20% below TDEE is a good place to start

Examples:

1.

- Your weight is 120 lbs.
- Your TDEE is 2033 calories
- Your calorie deficit to lose weight is 500 calories
- Your optimal caloric intake for weight loss is $2033 - 500 = 1533 \text{ calories/day}$

2.

- Your calorie deficit to lose weight is 20% of TDEE ($0.20 \times 2033 = 406$ calories)
- Your optimal caloric intake for weight loss is $2033 - 406 = 1627 \text{ calories/day}$

Gaining Weight

- To gain body weight and become more muscular, you must consume more calories than you burn in a day
- A positive calorie balance is necessary for weight gain
- Provided you are participating in a weight training program of a sufficient intensity, frequency, and volume, the additional protein calories will be used to create new muscle tissue

Gaining Weight

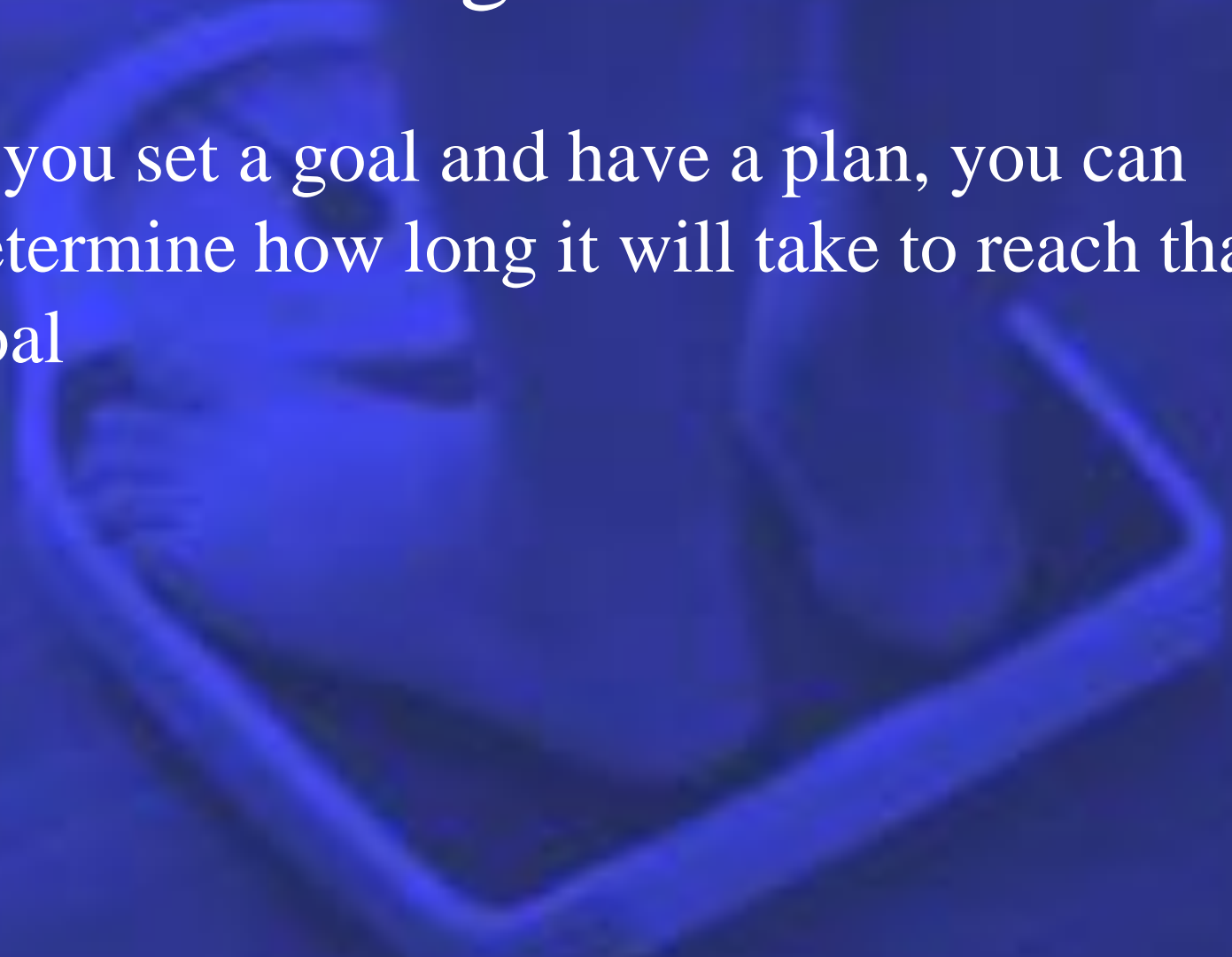
- A general guideline for a starting point for weight gain is to add 300-500 calories per day onto your TDEE
- An alternate method is to add an additional 15-20% onto your TDEE
- Gradually increase your caloric intake—a sudden increase in calories can lead to fat gain rather than lean mass

Example:

- Your weight is 120 lbs.
- Your TDEE is 2033
- Your additional caloric requirement for weight gain is + 15-20% = 305-406 calories
- Your optimal caloric intake for weight gain is $2033 + 305-406 = 2338-2439$ *calories*

How Long Will it Take?

- If you set a goal and have a plan, you can determine how long it will take to reach that goal



Some Scenarios...

- You are female
- You are 30 years old
- You weigh 140 lbs
- You are 5'6" tall (66 inches)
- You have set a goal to reach 130 lbs
- You have decided to cut your calories by 500/day
- You exercise 1 hour a day, your activity factor is 1.55

Step 1: Find your BMR

$$655 + (9.6 \times 63.5) + (1.8 \times 167.6) - (4.7 \times 30) = 655 + 609.6 + 301.68 - 141 = \mathbf{1425 \text{ calories/day}}$$

Step 2: Find your TDEE

$$1425 \times 1.55 = \mathbf{2208 \text{ calories/day}}$$

Step 3: Deduct your caloric deficit

$$2208 - 500 = \mathbf{1708 \text{ calories/day}}$$

By deducting 500 calories/day, you will lose 1 pound every 7 days.

To reach your goal weight of 130 lbs, you need to lose 10 pounds

7days/pound x 10 pounds = 70 days to reach your goal!

- You are male
- You are 25 years old
- You weigh 190 lbs
- You are 6'0" tall (72 inches)
- You have set a goal to reach 175 lbs
- You have decided to cut your calories by 500/day
- You exercise 1 hour a day, your activity factor is 1.55

Step 1: Find your BMR

$$66 + (13.7 \times 86.18) + (5 \times 182.88) - (6.8 \times 25)$$

$$66 + 1181 + 914.4 - 170 = \mathbf{1991 \text{ calories/day}}$$

Step 2: Find your TDEE

$$1991 \times 1.55 = \mathbf{3086 \text{ calories/day}}$$

Step 3: Deduct your caloric deficit

$$3086 - 500 = \mathbf{2586 \text{ calories/day}}$$

By deducting 500 calories/day, you will lose 1 pound every 7 days

To reach your goal weight of 175 lbs, you need to lose 15 pounds

$$7\text{days/pound} \times 15 \text{ pounds} = 105 \text{ days to reach your goal!}$$

Exercise

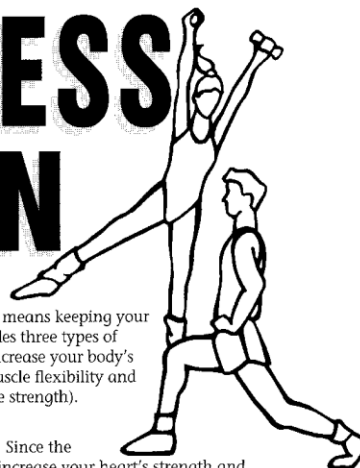
- Weight loss — accentuate cardiovascular fitness, strength training will help
- Weight gain — accentuate strength training, cardiovascular is still important



DEVELOPING A PERSONAL

- ▶ **Aerobics**
- ▶ **HEALTH**
- ▶ **Flexibility**
- ▶ *Resistance Exercise*
- ▶ **STRENGTH**
- ▶ *Stretching*

FITNESS PLAN



FITNESS. It's a much-confused term. To some, it means being trim or muscular. But total fitness is more than that—it means keeping your body in top working order. A total physical fitness plan includes three types of exercise—*aerobics* (which exercise large muscle groups and increase your body's ability to use oxygen), *stretching exercises* (which improve muscle flexibility and joint mobility) and *resistance exercises* (which increase muscle strength).

Aerobics—The Core of Your Program

Your heart pumps oxygen-rich blood to the rest of your body. Since the heart itself is a muscle, aerobic exercises maintain and even increase your heart's strength and endurance. When done correctly, such exercises help your heart reach and maintain a target heart range (THR) for 20 to 30 minutes. Your THR is the safest and most effective range of heartbeats per minute during exercise. (The chart shows approximate THRs for various ages.) Activities such as swimming, walking, jogging, stair-climbing and cross-country skiing are aerobic.

Stretching for Flexibility

Stiff, weak muscles can limit movement, increase your risk of injury, fail to support the rest of your body and make it hard to maintain a vigorous activity long enough to reach your THR. Stretching exercises improve muscle flexibility and joint mobility when the stretch is comfortably held for 10 to 20 seconds without bouncing.

Resistance Exercise for Strength

Muscles not only support all the bones in your body, they make even routine physical activities possible, not to mention sudden or strenuous ones. Strengthening muscles strengthens joints and reduces the risk of osteoporosis. Pushups, pullups and weightlifting are resistance exercises that strengthen muscles.

A Healthy Lifestyle—

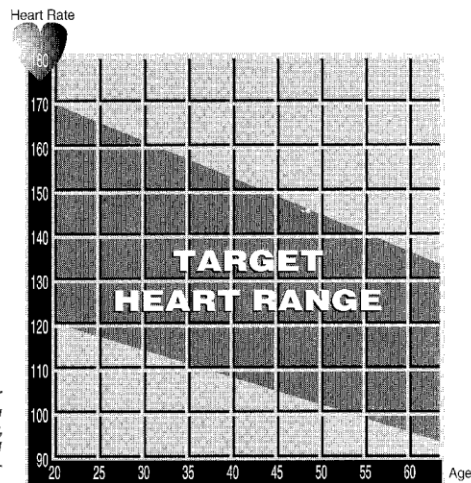
Rounding Out Your Plan

Fitness also includes weight control, proper nutrition and stress reduction. Becoming fit is saying "yes" to a fuller life and "no" to unhealthy habits, such as smoking, alcohol and drug misuse. A total fitness plan can increase both the number and the quality of the years ahead of you.


Starting Your Plan

As you begin your fitness plan, pace yourself. Learn your correct THR and try not to exceed it. Choose activities you enjoy as your core aerobic exercises and do a variety of conditioning exercises to improve flexibility and muscle strength. Finally, make healthy lifestyle choices to help yourself become healthy and fit.

Aim for the low range of your THR when you first begin your fitness plan. Gradually work up to the higher range as you become more physically fit. However, if you are a smoker, suffer from a chronic medical condition or have a personal or family history of heart disease, check with your health-care professional before starting any exercise program.



The FIT Formula



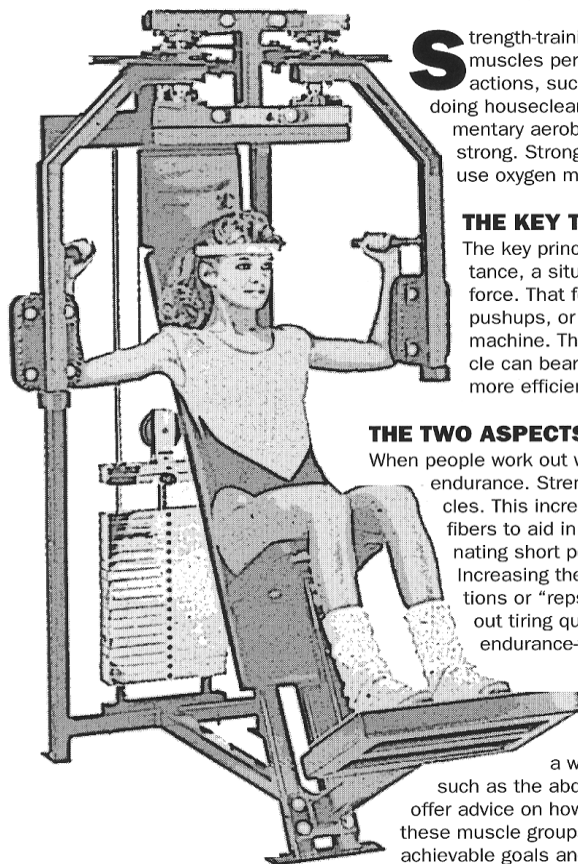
Intensity—exercise should raise your heartbeat to its target heart range (THR).

Time—maintain your TIR for 20 to 30 minutes.

The approximate Number of Calories that an average 150 – pound person burns per hour at various activities

Exercise	Calories Burned per hour
Sleeping.....	80
Driving a car.....	168
Walking 3 mph	250
Swimming .5mph.....	300
Volleyball.....	350
Running 6 mph.....	600
Biking (5 ½ mph).....	210
Gardening.....	220
Golf.....	250
Aerobics.....	445
Jogging.....	585
Walking 4.5mph.....	436





Strength-training is more than just building gorgeous muscles. Fit muscles perform better all day long, even performing mundane actions, such as moving files, restocking the supply room or doing housecleaning. Physical conditioning also enhances complementary aerobics programs by keeping muscles flexible and strong. Strong, efficient muscles support our bodies better and use oxygen more effectively, placing less strain on our hearts.

THE KEY TO MUSCULAR STRENGTH

The key principle in developing muscular performance is resistance, a situation in which muscles work against a resisting force. That force may be a person's own body, as with pushups, or an external force, such as a barbell or a weight machine. The idea is to progressively increase the load a muscle can bear so that it can grow larger and stronger and work more efficiently.

THE TWO ASPECTS OF MUSCULAR HEALTH

When people work out with weights, they can build both strength and endurance. Strength is built by progressively overloading the muscles. This increasing of the resisting weight recruits more muscle fibers to aid in the movement. Endurance is developed by alternating short periods of exertion with periods of rest or recovery. Increasing the number of times a weight is lifted, called repetitions or "reps," builds a muscle's ability to expend energy without tiring quickly. Many muscles that support posture are endurance-type muscles.

A STRENGTH-TRAINING PROGRAM

Most people who pursue strength training seriously do so at least twice and usually three times a week. They concentrate on particular muscle groups, such as the abdominals, upper body or legs. Most health clubs offer advice on how to get the most out of the equipment that targets these muscle groups. If you plan to work out at home, aim for specific, achievable goals and likewise concentrate on your particular muscle

groups. If you have a pre-existing condition that may be affected by resistance exercises, such as high blood pressure or low back pain, ask your physician about a strength training program that's suited to you. You'll look, feel and perform better and enjoy long-term benefits as well.

Strength Training Is Important Too



Nautilus Training Principles

General procedures to be followed on all machines where the regular (positive-negative) form of exercise is performed:

1. On any machine where seat adjustments or body positioning can be varied, make certain that the rotational axis of the cam is directly parallel to the rotational axis (joint) of the body part that is being moved.
2. Position your body in a straightly aligned manner. Avoid twisting or shifting your weight during the movement.
3. Never squeeze hand grips tightly, but maintain a loose, comfortable grip (a tight grip elevates blood pressure).
4. Lift resistance (positive work) to the count of two... pause ... lower the resistance (negative work) slowly and smoothly while counting to four.
5. For full-range strength and flexibility (and protection against injury) your range of movement on each machine should be as great as possible.
6. Breathe normally. Try not to hold your breath while training.
7. Perform each exercise for 8 to 12 repetitions for upper body exercises; 15 to 20 repetitions for lower body exercises.
 - a. Begin with a weight you can comfortably do 8 times (15 for lower body).
 - b. Stay with that weight until you can perform 12 strict repetitions (20 repetitions for lower body). On the following workout, increase the weight (approximately 5%) which should result in your inability to perform more repetitions than the minimum guideline dictates.
 - c. Ideally, on every workout repetitions that the minimum guidelines dictates.
8. For best cardio respiratory (heart-lungs) conditioning, move quickly from machine to machine (this speed does not apply to the actual exercises). The longer the rest between machines, the less effective the cardio respiratory conditioning.
9. When possible, follow your routine as the exercises are numbered on your workout sheet; however, any time the machine you are to do next is being used, go to another exercise and then return to the machine that was in use.
10. All Compound and double machines were designed to make use of the pre-exhaustion principle (where a single-joint exercise is used to pre-exhaust a given muscle and a multiple-joint exercise is used to force the exhausted muscle to work even harder); therefore, it is important to move very quickly (in less than 3 seconds) from the primary exercise to the secondary exercise.
11. Your training should include a maximum of 12 exercises, 4 to 6 for the lower body and 6 to 8 for the upper body (a compound machine counts as two exercises).
12. Exercise the larger muscle groups first and proceed to the smaller muscle groups (hips, thighs, back, shoulders, chest, arms and neck).
13. Your entire workout should take from 20 to 30 minutes.
14. The time lapse between exercise sessions should be at least 48 hours and not more than 96 hours.

Setting Fitness Goals

- Setting Long- Range Goals
 - Setting Working Goals
 - Keeping a Planner
 - The Payoff



Healthy Weight-loss Tips

- Start your day with a good breakfast!
- Take a multi-vitamin/mineral at least once a day.
- Drink plenty of water
- Eat more raw fruits and vegetables.
- Decrease consumption of starches and simple sugars
- Eat less dinner
- Eat well at least 5 days each week, eat fairly well the other 2 days, eat what you really want 1 dinner each week, eat a light dessert no more than twice per week.
- Snack on fruit, yogurt, pretzels, trail mix, cold veggies, unbuttered popcorn, baked chips, crackers, etc.
- Eat mindfully!

Obtaining and Maintaining Optimal Body Weight



Q & A